cigarette smoking, and other demographics do not. Our simple risk model could aid in decision-making in the clinic and highlights areas of potential intervention to reduce NRM following auto HCT.

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Risk Factors for Musculoskeletal Symptoms in 5-20 Year Survivors Who Received Myeloablative Hematopoietic Cell Transplant (HCT)

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Introduction: Survivors after HCT often have musculoskeletal complications and symptoms. Although risk factors for many of the musculoskeletal complications have been defined, risk factors for symptoms remain unknown.
Methods: All HCT survivors treated at the Fred Hutchinson Cancer Research Center and living in zip codes beginning with 98 were approached and asked to complete patient reported outcomes (PRO) and permit use of their medical records. To reduce age-related confounding of musculoskeletal symptoms associated with HCT, eligibility criteria included survivors between ages 18-49, with myeloablative HCT for hematologic malignancy between 5-20 years before approach and English proficiency adequate to complete the PRO. Exclusion criteria were relapse or second cancer other than basal or squamous cell skin cancer within the previous 2 years. We used the Muscle and Joint Measure (MJM) with subscales to evaluate outcomes of cramps, arthralgias, myalgias and weakness. Due to a lack of normative information, we used the mean plus 0.5 SD for each subscale as a cut point to define patients with more severe symptoms. Variables significant at $p<.10$ were retained from univariate regressions, followed by backward elimination to $p<.05$ level for the final models.
Results: Of 170 eligible participants, 142 completed the PRO (84%). A majority were male (53%) with mean age 39.5 (SD=8.9), years post-HCT mean of 11.2 (SD=4.6); 40% received related allogeneic HCT, 32% unrelated, 28% autologous; 65% received TBI, 32% received bone marrow as a source of stem cells. For late effects potentially relevant to musculoskeletal symptoms, 16% had taken oral immunosuppressants for >24 months for chronic graft versus host disease (cGVHD), 8% were currently taking medication for cGVHD, 8% were taking diabetes medication, 17% reported avascular necrosis (AVN), 18% reported arthritis, and 49% had ≥ 2 comorbid conditions. Survivors reporting symptoms of moderate or greater intensity (>4 on 0-10 scale) and occurring at least weekly were: cramps 30%, myalgias 26%, joints 22%, and weakness 20%. Table 1 defines risk factors.
Conclusions: Different risk factors predicted each of the musculoskeletal symptoms in HCT survivors. Further research is needed to understand mechanisms and treatments for these symptoms, particularly for cramps which are the most prevalent.

Table 1
Final models for multivariate logistic regressions of risk factors for musculoskeletal symptoms

	OR (95% CI)	P
Cramps		
Age ≥ 40	2.45 (1.1-5.5)	0.03
Katz comorbidity ≥ 2	2.42 (1.1-5.3)	0.03
Arthritis	6.71 (2.4-18.5)	0.0002
AVN	3.28 (1.2-8.8)	0.02
Arthralgia		
GVHD meds now	8.68 (2.1-35.5)	0.003
Age ≥ 40	4.44 (1.6-12.2)	0.004
Arthritis	22.3 (6.9-72.7)	<0.0001
Myalgia		
Katz comorbidity ≥ 2	2.27 (1.1-4.8)	0.03
AVN	2.83 (1.1-7.1)	0.03
Weakness		
GVHD meds now	12.4 (2.4-63.0)	0.002
AVN	3.09 (1.1-8.4)	0.03
Diabetes	6.71 (1.8-25.2)	0.005

LEUKEMIA

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Outcome of Allogeneic Hematopoietic Stem Cell Transplantation for Acute Myeloid Leukemia Patients with Central Nervous System Involvement

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Introduction: Central nervous system (CNS) involvement in adult acute myeloid leukemia (AML) occurs in 2-4% of patients at diagnosis, and is considered to have a poor prognosis. Therefore, CNS involvement in AML is an indicator for allogeneic hematopoietic stem cell transplantation (allo-HSCT). However, the impact of CNS involvement in AML on the outcome of allo-HSCT remains unclear. We performed a large-scale nationwide retrospective analysis to elucidate the outcomes of allo-HSCT for AML with CNS involvement.
Methods: Clinical data were collected from a registry database of the Japan Society for Hematopoietic Cell Transplantation. AML patients with CNS involvement aged 16 years or older who underwent the first allo-HSCT between January 2006 and December 2011 were compared to the AML patients without CNS involvement who underwent the first allo-HSCT in the same period. CNS diseases of these patients were diagnosed at any time from onset to allo-HSCT. The clinical factors affecting overall survival (OS) of AML patients with CNS involvement were analyzed using log-rank test and Cox proportional hazard model.
Result: There were 157 and 4911 AML patients with and without CNS involvement, respectively. Clinical